(4)

United States Government **Department of Energy**

memorandum

Idaho Operations Office

Date: December 5, 1997

Subject: Assessment of Known Vulnerabilities at INEEL (AM-OPE-97-043)

To: Distribution

This memorandum reports the status of assessments being performed in response to Secretary Peña's Memorandum of August 4, 1997, regarding known vulnerabilities at the INEEL.

DOE-ID and Lockheed Martin Idaho Technologies Company have reviewed known deficiencies identified in four documented DOE-wide vulnerability assessments. Each of these vulnerability assessments has a corresponding Headquarters Plan of Action to resolve vulnerabilities.

The Chemical Safety Vulnerability Working Group Report Management Response Plan identifies three actions. One of these actions concerns the management of chemically contaminated soils. These soils are adequately managed and controlled under the CERCLA program at INEEL. The second action concerns the disposition of 10,000 gallons of dichromate solution contained in a High Level Waste Tank cooling system. This system has been reviewed and is being adequately monitored and maintained. The third action concerned Emergency Management Program documentation, and these inconsistencies have been corrected since 1994.

The Plutonium Working Group Report considered INEEL to be a minor site and had no recommendations.

The Highly Enriched Uranium Working Group Report Identified eleven vulnerabilities, three of which were considered as "most significant" in the Management Plan and have formal plans for remediation. The first of these "most significant" vulnerabilities concerns the risk of fire and spread of contamination in the ROVER facility. The ROVER facility has been undergoing significant remediation over the last three years and is expected to be complete by June 1998. The second vulnerability concerns the integrity of 53 drums containing uranium-233 at the Radioactive Waste Management Complex (RWMC) and this vulnerability has been completely remediated. The third vulnerability concerns integrity and spacing issues of uranium-233 stored under soil at the Transuranic Storage Area at the RWMC. A building has been completed over the storage area, and these materials will be remediated as part of the Advanced Mixed WasteTreatment program. Of the remaining 8 vulnerabilities, four remain open, two of which concern the ROVER facility, one concerns seismic stability of fuel storage in Building CPP-651, which will be remediated when fuel movement plans are completed and material is moved elsewhere. The last open vulnerability concerns numerous small quantities of uranium in aging facilities, and each location is being evaluated and suitability should be determined by September 1998.

The Spent Nuclear Fuel Vulnerability Assessment identified several buildings at INEEL that store Spent Nuclear Fuel. Vulnerabilities were identified at each of these facilities. These

vulnerabilities have been incorporated into an action plan that is reviewed quarterly. These vulnerabilities have received and continue to receive program support and are managed by an active DOE-Headquarters and DOE-ID program office. One vulnerability concerning spent fuel in the Advanced Reactivity Measurements Facility/Coupled Fast Reactivity Measurement Facility (ARMF/CFRMF), has been eliminated with the removal of fuel from that facility. Additional efforts are underway to move the Three Mile Island fuel debris to a Nuclear Regulatory Commission licensed facility at the Idaho Chemical Processing Plant. Several vulnerabilities are associated with wet storage of spent fuel in the CPP-603 building. These materials are being moved as rapidly as possible to other facilities and to dry storage. The removal of many of these vulnerabilities are also commitments to the State of Idaho and contained in the Governor's agreement and subject to court enforcement if the agreements are not met. Appendix D of the attachment contains the detailed Lockheed status for the vulnerabilities that remain open.

DOE-ID line management continues to work toward closing these vulnerabilities as funding becomes available or risks dictate priorities be higher due to better characterization and changing conditions. If you have any questions regarding the attached response, please contact W. D. Jensen at 208-526-7500 or B. G. Edgerton at 208-526-1081.

J. M. Wilcynski
Manager

ATTACHMENT

DISTRIBUTION

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December 2, 1997

Mr. J. M. Wilcynski
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REQUEST FOR SPECIFIC ACTION, ASSESSMENT, AND REPORTING BASED ON VULNERABILITIES IDENTIFIED IN THE MAY 1997 HANFORD TANK EXPLOSION – WJD-163-97

Reference: (a) J. M. Wilcynski letter to W. J. Denson, (OPE-SP-97-093), Request for Specific Action, Assessment, and Reporting Based on Vulnerabilities Identified in the May 1997 Hanford Tank Explosion, August 14, 1997

Dear Mr. Wilcynski:

The reference letter requested LMITCO to reassess known vulnerabilities (chemical and radiological) at facilities that have been shutdown, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years. As a partial response to this request, LMITCO has reviewed four documented DOE-wide vulnerability assessments:

- The chemical vulnerability assessment performed in 1994
- The plutonium vulnerability assessment performed in 1994
- The highly enriched uranium (HEU) vulnerability assessment performed in 1996
- The spent nuclear fuel (SNF) vulnerability assessment performed in 1993

The enclosed Vulnerability Assessment Review documents the current status of INEEL responses to these assessments.

If you need additional information about the review of these previous assessments, please contact T. D. Lee at 526-4744.

Sincerely,

W. J. Denson
President

TDL:dh

Enclosure

cc: G. E. Ellis, LMITCO, MS 3898
W. D. Jensen, DOE-ID, MS 1101

Vulnerability Assessment Review

Section 2.2 of the Project Management Plan for the INEEL Response to the Hanford Tank Accident requires in part: " ... reassess known chemical and radiological vulnerabilities at facilities that have been shut down, are in standby, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years, and report status. ... "

In partial response to this requirement, LMITCO has reviewed the four documented DOE-wide vulnerability assessments, which are: the chemical vulnerability assessment performed in 1994[1], the plutonium vulnerability assessment performed in 1994[3], the highly enriched uranium (HEU) vulnerability assessment performed in 1996[5,7], and the spent nuclear fuel (SNF) vulnerability assessment performed in 1993[8].

A Management Response Plan[2] was created for the chemical safety vulnerability field assessment for the DOE complex. The Management Response Plan indicated that the chemical vulnerabilities were incorporated into action plans. However, no system has been used to track closure of the vulnerabilities. Therefore, the information about the vulnerabilities had to be obtained from various sources and LMITCO personnel. Some of the facility managers, contacted during the assessment, had knowledge of the vulnerability assessment; however, many of those responsible for the areas where the actual vulnerabilities were found had no idea they were part of the vulnerability assessment findings. The chemical vulnerabilities have been corrected or are in the process of being corrected (see Table 1 for open items), except for the 10,000 gallons of water containing potassium dichromate stored in two tanks at the CPP tank farm; this material is still being held as a backup to the tank cooling system. Additional information is provided in Appendix A.

The plutonium analysis does not identify vulnerabilities at the INEEL. Therefore, no action items have been assigned at the INEEL for the plutonium assessment. Additional information is provided in Appendix B.

The HEU and SNF assessments have current action plans that are being worked. A status report is provided to DOE-ID quarterly for each of the action plans. Open action items are summarized in Tables 2 and 3. As new actions are identified for the HEU or SNF vulnerabilities, they are added to the action plans and tracked in the quarterly reports. Additional information is provided in Appendices C and D.

REFERENCES:

1. Chemical Safety Vulnerability Working Group Report, U.S. Department of Energy, DOE/EH-0396P, September 1994.

2. Management Response Plan for the Chemical Safety Vulnerability Working Group Report, U.S. Department of Energy, DOE/EH-0398P, September 1994.

3. Plutonium Working Group Report on Environmental, Safety and Health Vulnerabilities Associated with the Department's Plutonium Storage, U.S. Department of Energy, DOE/EH-0415, October 1994.

4. Plutonium Vulnerability Management Plan, U. S. Department of Energy, DOE/EM-0199, January 1995.

5. Highly Enriched Uranium Working Group Report on Environmental, Safety and Health Vulnerabilities Associated with the Department's Storage of Highly Enriched Uranium, U.S. Department of Energy, DOE/EH-0525, December 1996.

6. Highly Enriched Uranium Vulnerability Management Plan, U.S. Department of Energy, DRAFT, February 1997.

7. Highly Enriched Uranium ES&H Vulnerability Assessment Idaho National Engineering Laboratory Site Assessment Team Report, U.S. Department of Energy, DOE/ID-10538, July 1996.

8. Spent Fuel Working Group Report on Inventory and Storage of the Department's Spent Nuclear Fuel and other Reactor Irradiated Nuclear Materials and Their Environmental, Safety, and Health Vulnerabilities, U.S. Department of Energy, November 1993.

9. Plan of Action to Resolve Spent Nuclear Fuel Vulnerabilities Phase III, U.S. Department of Energy, October 1994.

10. External letter From: A. P. Hoskins, Manager, INEEL SNF Program, To: R. O. Ramsey, U.S. Department of Energy Idaho Operations Office, Subject: Vulnerability Action Plan Status Report for July-September 1997 APH-48-97, dated September 22, 1997.

Table 1. Corrective action schedule for INEEL open chemical vulnerabilities.

Number	Vulnerability	Corrective Action Step	Schedule
CSVR-INEL-CH-01	Contamination of soil by discharges of large quantities of hazardous material	• Use FFACO process to identify and control new sites • Control disturbances at identified sites. • Control exposures during remediation activities.	In Process In Process In Process
CSVR-INEL-CH-02	Delays in disposition of hazardous materials and waste.	• 10,000 gallons of cooling water stored in two tanks	In use.

Table 2. Corrective action schedule for INEEL open HEU vulnerabilities

Number	Vulnerability	Corrective Action Step	Schedule
CPP-640 WGAT-001	Fire and spread of contamination from combustible materials on the ROVER Facility operating floor. (Most significant INEEL vulnerability)	• Move HEU containers to interim storage area. • Clean ROVER Facility to reduce HEU material loading to below 350 grams.	December 1997 June 1998 (IP)
CPP-640 SAT-001	Nuclear criticality accident caused by leaks in building roof.	• Revise safety analysis to reflect material reduction efforts.	March 1998
CPP-640 SAT-002	Failure of building from earthquakes or extreme winds.	Revise safety analysis to reflect material reduction efforts.	March 1998
CPP-651 SAT-004	Earthquake-caused flourinel fuel storage rack failures and nuclear criticality in the South vault.	• Develop fuel movement plans. • Procure material, package and ship flourinel material.	September 1998 Oct 98 - Sep 00
Multiple SAT-005	Worker contamination from the storage of numerous small quantities of HEU in aging facilities.	• Evaluate "material" in each location. • Develop recommendations and plans. • Obtain DOE approval of disposition plans. • Revise Safety Analysis for transfer to new storage. • Complete transfers and disposal.	September 1998 February 1999 March 1999 September 1999 September 2000
RWMC SAT-006	Loss of integrity of 53 drums containing U-233 currently in cargo containers in an open yard, resulting in nuclear criticality. (Second most significant INEEL vulnerability)	• Complete equipment preparations for drum disposition. • Complete staging for final transfer of drums. • Complete training and practice runs for transfer. • Complete transfer of drums to improved storage at RWMC	August 1997 (IP) August 1997 October 1997 December 1997
RWMC SAT-007	Corrosion and loss of structural integrity and designed spacing of drums containing U-233, possibly resulting in a nuclear criticality accident. (Third most significant INEEL vulnerability)	• Complete installation of excavation equipment for buried-drum retrieval. • Complete training preparations for drum retrieval. • Begin drum retrieval from earth mound. • Complete drum retrieval and repackaging.	September 2002 September 2002 October 2002 Year 2015

Table 3. Corrective action schedule for INEEL open SNF vulnerabilities

Number	Vulnerability	Corrective Action Step	Schedule
CPP-603 Storage Facility			
ID.W1.1	Corroded spent fuel, some clad with aluminum canisters is resulting in the release of fissile material and radionuclides into the basin environment.	• Remove basin water after the removal of all fuel.	September 1997
ID.W 1.2	Lack of complete characterization of material in storage. State of encapsulated material is unknown.	• 11 cans of EBR-II had water in will be moved to interim storage and ultimate disposition.	October 1997
ID.W 1.11	The fuel storage pools do not meet current seismic design standards. Basin wall failure or superstructure collapse due to a seismic event, could result in a loss of pool water, decreased margins for preventing criticality and a release of radioactive materials to the environment.	• Complete Basin Water Removal Program Plan. • Complete transfer of all remaining fuel from south basin (331 fuel units which are non-corroded completed by 9/98; 428 canned fuel units which includes the 36 fuel units and the 5 unidentified objects reading 200 R/hr transferred from the north and middle basins to the south basin for canning) to CPP-666 Basin or to dry storage as appropriate. • Complete removal of basin water.	September 1997 December 2000 December 2003
ID.W 5	Complete removal of all SNF not requiring overpacking by 12/98.	A total of 289 fuel handling units have been transferred from the south Basin as of 9/97.	December 1998
ID.W 7	Complete all fuel removal from the CPP-603 South Basin by 12/00.	A total 289 fuel handling units have been transferred from the South Basin as of 9/97.	December 2000
ID.W 10	Issue Waste Management PEIS ROD.	EM-1 was delegated as approval authority and the WMPEIS document was approved 5/23. Sequenced RODs to be issued throughout FY-97/98 with the first ROD, for TRU waste, to be issued in the Fall '97.	September 1998

Number	Vulnerability	Corrective Action Step	Schedule
CPP-666 Fuel Storage Area			
ID.W 2.1	Corrosion of aluminum-clad fuel and release of fissile material and radionuclides into the CPP-666 basin environment.	• Implement improved monitoring and control of basin water for chemical, radioactive, and biological contaminants. • Replace CPP-666 basin water chiller. • Complete safety analysis, design and procurement activities required to provide the capability for isolating problem fuel handling units from the CPP-666 basin water. • Begin safety analysis, design and procurement activities required to provide the capability for isolating problem fuel handling units from the CPP-666 basin water. • Complete studies needed to determine possible alternatives for safe dry storage, in either existing facilities or new facilities, of aluminum-clad fuel stored in CPP-666. • Construct new facility or ready existing facility to receive aluminum-clad fuel. • Begin transfer of sufficiently cooled aluminum-clad fuel out of CPP-666 and into dry storage.	September 1997 April 1998 September 1998 October 1997 Ongoing. TBD TBD
ID.W 2.2	Susceptibility to damaging engineered safety features, specifically loss of air to pool gate seals, exists which could result in lowering pool water level. In addition, engineered-safety features have been downgraded and declared to be not required without performing and Unreviewed Safety Question Determination.	• Complete the rewrite of the plant Safety Document (PSD) section for CPP-666 to 5480.23 format to address ESF issues by 9/97. • Functionally check and/or inspect ESFs for compliance with the intent of the design and revised PSD. • Evaluate the ESF monitoring program to assure that the ESFs remain in compliance with the revised PSD. • Evaluate the ESF preventive maintenance program to assure that the ESFs are always functional as intended per the PSD.	February 1998 September 1998 September 1998 September 1998

Number	Vulnerability	Corrective Action Step	Schedule
CPP-603 Irradiated Fuel Storage Facility			
ID.W 3.3	Roof collapse and Control Room failure due to a large seismic event.	• Complete seismic evaluation of IFSF concrete structure including roof to current standards. • Initiate corrective/upgrade/replacement actions developed in item 3.3c.	September 1997 December 1997
CPP-603 Fuel Element Cutting Facility			
ID.W 2.3 ID.W 4.1 ID.W 5.1	There is no path for the ultimate disposal of fuel stored in the CPP-603 Fuel Element Cutting Facility (FECF), Fuel Storage Area, IFSF, and CPP-749 Drywell Storage.	• Continue the DOE National SNF Program to coordinate and integrate the DOE-owned SNF management activities and to reach a consensus agreed upon ultimate disposal plan. • Manage spent nuclear fuels in accordance with the Interim Storage Plan and ultimate disposal plan.	Ongoing Ongoing.
CPP-749 Drywells and CPP-603 IFSF			
ID.W 5.2	Potentially degrading aluminum fuel cans and baskets at CPP-749. Peach Bottom fuel is stored in aluminum cans in aluminum baskets which have been lowered into carbon steel cylinders. The environment is moist, which could cause deterioration of the aluminum. Fuel cans of a similar type have previously corroded.	• Complete preparations for transfer from first generation to second generation to drywells. • Complete 8 fuel transfers into second generation drywells. • Complete 25 fuel transfers into second generation drywells. • Complete 27 (13 Peach Bottom and 14 FERMI) fuel transfers into second generation drywells by the end of FY98.	September 1997 December 1997 September 1998 Completed September 1998

Number	Vulnerability	Corrective Action Step	Schedule
Test Area North			
ID.E 1.1	Corrosion monitoring inadequate at TAN.	• Transfer non-TMIO spent fuel from temporary dry storage to long-term dry storage at ICPP Area. • Remove non-TMI spent fuel stored in stainless steel modules (LOFT fuel). • Make preparations and remove TMI-2 debris to dry storage in accordance with the INEEL Integrated SNF Consolidation Plan. • Complete transfer of all spent fuel from TAN Sstroage Pool into interim dry storage in accordance with the INEEL Integrated SNF Consolidation Plan. • Complete inspections required for transfer of spent fuel to interim dry storage.	September 1999 September 1998 November 1999 November 1999 November 1999
MTR Canal, ARMF/CFRMF, and PBF Canal			
ID.E 3.1 ID.E 4.1 ID.E 5.1	Corrosion monitoring inadequate at Materials Test Reactor (MTR), Advanced Reactivity Measurement Facility /Coupled Fast Reactivity Measurement Facility (ARMF/CFRMF) Canal, and Power Burst Facility (PBF).	• Develop cost, scope, and schedule for removal of fuel to dry storage in accordance with the INEL Integrated SNF Storage Consolidation Plan. • Complete transfer of spent fuel into interim dry storage in accordance with the INEEL Integrated SNF Consolidation Plan by 9/98 at MTR and ARMF/CFRMF. • Develop a plan to disposition the drums that contain sample residues from the TMI characterization program at MTR. Identified during HEU Vulnerability Assessment.	Ongoing December 2000 September 1997

APPENDIX A

Chemical Vulnerability Assessment

The following two vulnerabilities identified at the INEEL during the chemical vulnerability assessment have open action items:

1. Past Chemical Spills

CSVR-INEL-CH-01: Contamination of Soil by Discharges of Large Quantities of Hazardous Material

Four hundred spills, leaks, and discharges of hazardous materials to the soil have been identified for INEEL, 83 of which were found at ICPP. Spills of hazardous materials have occurred from process lines and from bulk storage areas at the ICPP. In the past, there have also been intentional discharges of hazardous materials to soils. Known releases have occurred from pipes in the vent tunnel at CPP-601, from bulk chemical storage facilities at CPP-621, and leaks of high-level waste and dichromate at the tank farm. Other releases to soil have occurred through discharge of cleaning agents to french drains, tank overflows, punctured drums, and discarded paints and paint solvents. These leaks, spills, and discharges create the potential for the future exposure of workers and release to the environment during construction, decontamination and decommissioning (D&D), and other activities that disturb the soil.

Open Action Items: Previous spill sites are controlled under the CERLCA program at the INEEL. There are presently ten waste area groups established at the site established to remediate CERCLA sites at the various areas at the site. If new sites are identified, they are included in the CERCLA remediation activities and analyzed according to CERCLA guidelines.

2. Planning for the Disposition of Chemicals

CSVR-INEL-CH-02: Delays in Disposition of Hazardous Materials and Waste

About 10,000 gallons of cooling water containing dichromate are stored in two tanks without secondary containment in the ICPP tank farm area. The cooling system has not been used since 1988 and will not be needed again for at least 5-10 years.

Open Action Item: The 10,000 gallons of cooling water containing potassium dichromate is still being used as a backup system to the tank cooling system. It is being monitored and maintained.

APPENDIX B

Plutonium ES&H Vulnerability Assessment

The Plutonium working group identified INEEL as a DOE site with small plutonium holdings with no vulnerabilities identified. The report[3, 4] states: "Two Idaho Operations Office sites were reviewed: INEEL, Idaho and West Valley Demonstration Project, New York. The 784 grams of plutonium holdings at these sites consist of sealed sources, solids, oxide and liquids. INEEL also has 1.8 metric tons, and West Valley 313 grams, of plutonium in transuranic waste not within the scope of this assessment." Therefore, no further work has been done at INEEL on the plutonium vulnerability assessment.

APPENDIX C

Highly Enriched Uranium Vulnerability Assessment

The Highly Enriched Uranium (HEU) vulnerabilities come from two assessments performed at the INEEL during 1996.

DOE headquarters established one team to identify vulnerabilities through out the DOE complex. This team identified four vulnerabilities at the INEEL that were identified in the Highly Enriched Uranium Working Group Report.[5,6] One of these vulnerabilities has an open action item:

INEL-CPP-640-WGAT-001: Fire and spread of contamination from combustible materials on the ROVER Facility operating floor.

The ROVER Fuels Processing Facility in Building CPP-640 contains approximately 160 kilograms of HEU ash and burner bed materials held up in the process vessels. Because an inadvertent addition of water to these vessels could cause a nuclear criticality, the fire sprinkler system on the operating floor has been disabled. Given this condition and significant accumulations of combustibles on the operating floor, the facility is at risk of an uncontrolled fire that could lead to worker contamination and exposure.

Open Action Item: Ongoing corrective action features a concerted effort to remove HEU from the ROVER Facility. Draining of the bed material containing HEU from VES-104 into approved storage containers began in August 1996 and has been completed. The containers will be transferred to the ICPP by December 1997 for long-term storage pending final disposition. After the HEU ash has been removed, the facility will be cleaned to reduce any residual uranium loading to levels below 350 grams, which will significantly reduce any remaining criticality and exposure concerns. This residue cleanup is scheduled for completion by June 1998.

The other team was established by INEEL to identify only those HEU vulnerabilities at the INEEL. The Site Assessment Team identified seven vulnerabilities. The assessment results are published in "Department of Energy Highly Enriched Uranium ES&H Vulnerability Assessment Idaho National Engineering Laboratory Site Assessment Team Report."[7] Six of these vulnerabilities have open action items:

1. **INEL-CPP-640-SAT-01:** Possibility of loss of moderator control in CPP-640.

   A few large-volume, unsafe geometry vessels in the MHC and Cells 3 and 4 of the ROVER facility contain large amounts of uranium. While dry, these vessels are critically safe. The addition of moderator to a vessel, however, could create a critical system. Also, the addition of moderator into a process cell, combined with a spill of material from one of the vessels, could result in a criticality on the cell floor. The facility relies on maintaining tight control on the amount of moderator present in order to remain critically safe. The roof of the facility leaks. Water exists in the lower levels of the fire sprinkler system, but the system is isolated from the upper level.

   Open Action Item: Revise safety analysis to reflect material reduction efforts - March 1998.

2. **INEL-CPP-640-SAT-02:** Potential compromises of confinement structures due to sever earthquakes or sever winds.

   CPP-640 is not seismically qualified to current standards (built in 1961). The process cell walls are thick, reinforced concrete shielding walls and appear to be structurally sound. A severe earthquake could potentially cause structural damage, compromising process vessels and other confinement features, resulting in local spread of contamination. The CPP-640 roof is not

qualified to withstand extreme winds, and wind failure of the roof could cause damage to confinement features in the MHC are of the ROVER system, resulting in local contamination spread and loss of strict moderator control.

Open Action Item: Revise safety analysis to reflect material reduction efforts - March 1998.

See also corrective action steps to vulnerability INEL-CPP-640-WGAT-001.

3. **INEL-CPP-651-SAT-04:** Structure failure.

CPP-651 inner building (north and south vaults) and south vault fuel storage racks have not been verified to be seismically qualified. A seismic event could cause a failure of the inner building, which supports all fuel storage racks. Damage to fuel storage racks and rack supports could result in criticality resulting from loss of geometry.

Open Action Item: Develop fuel movement plans - September 1998.

4. **INEL-Multiple SAT-05:** Worker contamination from the storage of numerous small quantities of HEU in aging facilities.

Collectively, these facilities increase the probability that an incident with HEU could happen on one of these facilities, in the next 5-10 years. Although the quantity of material in each facility is low, reducing the severity at each site, a problem still exists in storing small quantities of inactive HEU throughout the INEEL.

Open Action Items:

Evaluate "material in each location.	September 1998
Develop recommendations and plans	February 1999
Obtain DOE approval of disposition plans.	March 1999
Revise Safety Analysis for transfer to new storage.	September 1999
Complete transfers and disposal.	September 2000

5. **INEL-RWMC-ILTSF-SAT-006:** Loss of integrity of 53 drums containing U-233 in cargo containers in an open yard, resulting in nuclear criticality.

Fifty-three drums of U-233 have been stored for over 10 years in an open yard surrounded by concrete block shielding at the Intermediate Level Transuranic Storage Facility (ILTSF) of the Radioactive Waste Management Complex (RWMC). The U-233 is in the form of intact fuel rods, and the drums (U.S. Department of Transportation-approved 6M storage drums) are arrayed inside three metal cargo containers. Because the layered packaging design and current storage configuration do not allow for inspection, the condition of the drums cannot be determined. Undetected corrosion could lead to a loss of container and drum integrity, possibly resulting in the addition of water and a nuclear criticality event.

Open Action Items: Retrieval of the drums from the cargo containers and subsequent repackaging as necessary will commence in May 1997 and continue through December 1997. The final corrective actions for this vulnerability will include inspection, repackaging as necessary, and transfer of the U-233 to the ICPP for safe storage – all to be completed by December 1997.

6. **INEL-RWMC-TSA-SAT-007:** Corrosion and loss of structural integrity and designed spacing of drums containing U-233, possibly resulting in a nuclear criticality accident.

Approximately 150 drums of U-233 are stored in an earth-covered mound, along with thousands of drums of transuranic waste in the Transuranic Storage Area (TSA) of the RWMC. Despite compliance with the criticality safety double-contingency principle, and the moisture barriers built

into the container stack, this is not an ideal long-term storage configuration. Corrosion and a resulting loss of structural integrity of the U-233 drums could lead to nuclear criticality events.

Open Action Items:

Complete installation of excavation equipment for buried-drum retrieval.	September 2002
Complete training preparations for drum retrieval.	September 2002
Begin drum retrieval from earth mound.	October 2002
Complete drum retrieval and repackaging.	Year 2015

APPENDIX D

Spent Nuclear Fuel Vulnerability Assessment

The SNF assessment[8] focused on several buildings at the INEEL that store SNF. Vulnerabilities were identified at each of the facilities. These vulnerabilities have been incorporated into an action plan[9] that is reviewed quarterly. The disposition items and dates have been taken from the most current quarterly report.[10] The vulnerabilities are arranged by building; only those action items that are still open and being tracked are included in this report.

1. Vulnerabilities/Corrective Action Plans – Idaho CPP-603 Storage Facility

ID.W 1.1: Corroded spent fuel, some clad with aluminum or in corroded aluminum canisters is resulting in the release of fissile material and radionuclides into the basin environment.

Disposition:

The following items remain open and are tracked on the quarterly report:

1.1g Complete engineering development, design, safety analysis and installation of canning station, and associated Operational Readiness Review activities.

Canning station has been installed and undergone SO testing. Readiness Assessment completed 5/29/97 with some pre-start and some post-start findings identified. Operations began in July 1997.

1.1i See Item 1.11 concening plans to remove basin water after the removal of all fuel.

Action item is being handled as LMITCO project. Title I design is scheduled for completion 9/30/97.

ID.W 1.2: Lack of complete characterization of material in storage. State of encapsulated material is unknown.

Disposition:

The following items remain open and are tracked on the quarterly report:

1.2e Based on non-destructive examination (NDE) inspections where 11 cans of EBR-II had water in . Leakage establish a path forward for interim storage and ultimate dispostions. Action added as a result of HEU Vulnerability Assessment.

Documentation is being finalized to transfer the 16 EBR-II cans (11 leaking and five intact) to ANL-W. Cask lid is being fabricated and EBR-II overpack can is in design. The SAR and transport plan being reviewed. State approved shipment. Training will take place 9/97 with fuel movement in 10/97.

ID.W 1.11: The fuel storage pools do not meet current seismic design standards. Basin wall failure or superstructure collapse due to a seismic event, could result in a loss of pool water, decreased margins for preventing criticality and a release of radioactive materials to the environment.

Dispostion:

The following items remain open and are tracked on the quarterly report:

1.11c Complete seismic deficiency corrective actions (if determined necessary). Schedule TBD based on findings.

The installation of the recirculation cutoff switches was completed 12/13/95. Post maintenance testing was completed 12/96.

1.11d Complete Basin Water Removal Program Plan.

Action item is being handled as LMITCO project. Title I design is scheduled to be completed 9/30/97.

1.11e Complete transfer of all remaining fuel from south basin (331 fuel units which are non-corroded completed by 9/98; 428 canned fuel units which includes the 36 fuel units and the 5 unidentified objects reading 200 R/hr transferred from the north and middle basins to the south basin for canning) to CPP-666 Basin or to dry storage as appropriate. Complete by 12/00.

1.1f complete removal of basin water by 12/03.

The following six items are being tracked on the quarterly report for CPP-603 Fuel Storage Facility but they were not part of the original assessment.

Generic Issue: Lack of adequate authorization bases, including updated and approved safety analysis, that address long-term storage of RINM.

Disposition:

The fuel is being removed from CPP-603 basins. The SAR has been updated to conform to DOE Order 5480.23 requirements.

ID.W 5: Complete removal of all SNF not requiring overpacking by 12/98.

Disposition:

Initiated. A total of 289 fuel handling units have been transferred from the South Basin as of 9/97.

ID.W 6: Complete Dry Storage Overpacking Station construction and start-up by 12/98.

Disposition:

Canning station has been installed and has undergone SO testing. Readiness Assessment completed 5/29 with some pre-start and some post-star findings identified. Operations began July 1997 with drying of ARMF/CFRMF fuel. Completed 7/97.

ID.W 7: Complete all fuel removal from the CPP-603 South Basin by 12/00.

Disposition:

A total 289 fuel handling units have been transferred from the South Basin as of 9/97. Completion is forecasted for late 2000. The MTR canal fuel will be accepted into the IFSF canning station on a higher priority than some of the CPP-603 South Basin fuels.

ID.W 10: Issue Waste Management PEIS ROD.

Disposition:

EM-1 was delegated as approval authority and the WMPEIS document was approved 5/23. Sequenced RODs to be issued throughout FY-97/98 with the first ROD, for TRU waste, to be issued in the Fall '97.

2. Vulnerabilities/Corrective Action Plans – Idaho CPP-666 Fuel Storage Area

ID.W 2.1: Corrosion of aluminum-clad fuel and release of fissile material and radionuclides into the CPP-666 basin environment.

Disposition:

The following items remain open and are tracked on the quarterly report:

2.1a Complete CPP-666 water polisher and underwater vacuum system

SO testing of polisher completed and underwater vacuum system is operating. Completed 9/96.

2.1a Implement improved monitoring and control of basin water for chemical, radioactive, and biological contaminants.

Biological contaminants have been observed on corrosion coupons in CPP-666 basin. It is not yet known if the contaminants are actually on fuel/fuel containers. To determine this, bacteria swabs will be taken. The main affect that has been observed is pitting of aluminum coupons.

2.1a Replace CPP-666 basin water chiller.

Installation of a new system is scheduled to be completed by 4/98.

2.1c Complete safety analysis, design and procurement activities required to provide the capability for isolating problem fuel handling units from the CPP-666 basin water.

Not currently funded for FY-98. Final schedule TBD based on available funding.

2.1c Begin safety analysis, design and procurement activities required to provide the capability for isolating problem fuel handling units from the CPP-666 basin water.

Currently not funded for FY-97. Based on path forward of placing fuel in dry storage and the high quality of the SNF and water treatment systems item being reevaluated to determine if still needed.

2.1d Complete studies needed to determine possible alternatives for safe dry storage, in either existing facilities or new facilities, of aluminum-clad fuel stored in CPP-666.

Ongoing. A number of studies in the area of dry storage requirements have been completed and published.

2.1e Construct new facility or ready existing facility to receive aluminum-clad fuel. Schedule TBD.

2.1f Begin transfer of sufficiently cooled aluminum-clad fuel out of CPP-666 and into dry storage. Schedule TBD.

ID.W 2.2: Susceptibility to damaging engineered safety features, specifically loss of air to pool gate seals, exists which could result in lowering pool water level. In addition, engineered-safety features have been downgraded and declared to be not required without performing and Unreviewed Safety Question Determination.

Disposition:

The following items remain open and are tracked on the quarterly report:

2.2c Complete the rewrite of the plant Safety Document (PSD) section for CPP-666 to 5480.23 format to address ESF issues by 9/97.

Schedule is to submit SAR to DOE for review by 2/98 with implementation by 7/98.

2.2d Functionally check and/or inspect ESFs for compliance with the intent of the design and revised PSD.

ESF's will be reevaluated after SAR completed 9/98. CPP-666's new Plant Safety Document will eliminate all ESFs for the facility.

2.2e Evaluate the ESF monitoring program to assure that the ESFs remain in compliance with the revised PSD.

ESF's will be reevaluated after SAR completed 9/98. CPP-666's new Plant Safety Document will eliminate all ESFs for the facility.

2.2f Evaluate the ESF preventive maintenance program to assure that the ESFs are always functional as intended per the PSD.

ESF's will be reevaluated after SAR completed 9/98. CPP-666's new Plant Safety Document will eliminate all ESFs for the facility.

ID.W 2.3: There is no path for the ultimate disposal of fuel stored in the CPP-666 Fuel Storage Area.

Disposition:

The following items remain open and are tracked on the quarterly report:

2.3e Continue the DOE National SNF Program to coordinate and integrate the DOE-owned SNF management activities and to reach a consensus agreed upon ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

2.3f Manage SNF and facilities, including new facility construction, fuel transportation, fuel characterization and stabilization, fuel treatment and fuel disposal in accordance with the Interim Storage Plan and ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

3. Vulnerabilities/Corrective Action Plan – Idaho CPP-603 Irradiated Fuel Storage Facility

ID.W 3.3: Roof collapse and Control Room failure due to a large seismic event.

Disposition:

The following items remain open and are tracked on the quarterly report:

3.3b Complete seismic evaluation of IFSF concrete structure including roof to current standards.

Seismic evaluation has been completed. Condition Assessment Study and equipment evaluation of the IFSF have been completed. Recommendations of report being evaluated.

3.3c Complete a Condition Assessment Study on the IFSF to support future utilization in support of DOE SNF Management Program.

Condition Assessment Study and equipment evaluation of the IFSF have been completed 10/96.

3.3d Initiate corrective/upgrade/replacement actions developed in item 3.3c.

One action item was identified to reinforce the IFSF removable west wall. Soil/structure analysis completed and design is underway. Modification scheduled to be completed 12/31/97. Construction has started and is expected to be completed 12/31/97.

4. Vulnerabilities/Corrective Action Plan – Idaho CPP-603 Fuel Element Cutting Facility

ID.W 4.1: There is no path for the ultimate disposal of fuel stored in the CPPP-603 Fuel Element Cutting Facility (FECF).

Disposition:

The following items remain open and are tracked on the quarterly report:

4.1e Continue the DOE National SNF Program to coordinate and integrate the DOE-owned SNF management activities and to reach a consensus agreed upon ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

4.1 f Manage spent nuclear fuels in accordance with the Interim Storage Plan and ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

ID.W 4.2: Possible degraded Peach Bottom fuel.

Disposition:

The following items remain open and are tracked on the quarterly report:

4.2b Design and fabricate required inspection tools and equipment and develop inspection procedures.

Completed inspection tools, equipment, and procedures were used in the FECF video inspections completed 5/22/97.

4.2c Inspect the containers to determine condition and support the development of retrieval activities.

Completed inspection tools, equipment, and procedures were used in FECF video inspections completed 5/22/97.

5. Vulnerabilities/Corrective Action Plans – Idaho CPP-749 Drywells and CPP-603 IFSF

ID.W 5.1: There is no path for the ultimate disposal of fuel stored in the CPP-749 Drywell Storage Area or the CPP-603 IFSF.

Disposition:

The following items remain open and are tracked on the quarterly report:

5.1e Continue the DOE National SNF Program to coordinate and integrate the DOE-owned SNF management activities and to reach a consensus agreed upon ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

5.1f Manage spent nuclear fuels and facilities in accordance with the Interim Storage Plan and ultimate disposal plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

ID.W 5.2: Potentially degrading aluminum fuel cans and baskets at CPP-749. Peach Bottom fuel is stored in aluminum cans in aluminum baskets which have been lowered into carbon steel cylinders. The environment is moist, which could cause deterioration of the aluminum. Fuel cans of a similar type have previously corroded.

Disposition:

The following items remain open and are tracked on the quarterly report:

5.2a Complete preparations for transfer from first generation to second generation to drywells.

The Readiness Assessment has been delayed and will not be completed until 9/30/97.

5.2b Procure 8 fuel canisters.

On April 28, 1997, the last fuel support plates were fabricated (46 of 46).

5.2c Complete 8 fuel transfers into second generation drywells.

The first fuel transfer has been deferred until 10/97. Plan to complete 10 transfer late in 1997 but may be impacted by weather.

5.2e Complete 25 fuel transfers into second generation drywells.

These transfers are scheduled to begin after action item 5.2c transfers. Because fuel movement in CPP-749 are generally stopped by the end of October because of weather, this action item is not expected to finish before 9/30/98.

5.2f Procure 13 fuel canisters for last of Peach Bottom elements.

On April 28, 1997, the last fuel support plates were fabricated.

5.2g Complete 27 (13 Peach Bottom and 14 FERMI) fuel transfers into second generation drywells by the end of FY98.

6. Vulnerabilities/Corrective Action Plans – Idaho Test Area North Storage Pool

ID.E 1.1: Corrosion monitoring inadequate at TAN.

Disposition:

The following items remain open and are tracked on the quarterly report:

1.1c Transfer non-TMIO spent fuel from temporary dry storage to long-term dry storage at ICPP Area by FY2000.

1.1d Remove non-TMI spent fuel stored in stainless steel modules (LOFT fuel) by 9/98

1.1e Make preparations and remove TMI-2 debris to dry storage in accordance with the INEEL Integrated SNF Consolidation Plan by 11/99.

In progress. The removal of TMI-2 Core Debris will be promulgated in the INEEL SNF Management Plan. Draft plan issued 12/95 with the final plan to be issued as a CPAF milestone 9/97. Date changed from 1/96 to support NRC license submittal. Currently on schedule with no float remaining.

1.1f Complete transfer of all spent fuel from TAN Sstroage Pool into interim dry storage in accordance with the INEEL Integrated SNF Consolidation Plan by 11/99.

1.1g Complete inspections required for transfer of spent fuel to interim dry storage by 11/99.

Annual inspection of the aluminum coffins storing non-TMI SNF was completed 12/10/96. Next annual inspection to be completed prior to 12/31/97.

7. Vulnerabilities/Corrective Action Plans – Idaho Materials Test Reactor Canal

ID.E3.1: Corrosion monitoring inadequate at MTR.

Disposition:

The following items remain open and are tracked on the quarterly report:

3.1d Develop cost, scope, and schedule for removal of fuel to dry storage in accordance with the INEL Integrated SNF Storage Consolidation Plan.

Draft INEL SNF Management Plan issues on 12/21/95. Final SNF Management Plan to be issued following INEEL Task Team report. The final report is now being updated to be consistent with EM 10-year plan. Plan to be issued 9/97 as a CPAF milestone.

3.1e Complete transfer of spent fuel into interim dry storage in accordance with the INEEL Integrated SNF Consolidation Plan by 9/98.

A change control board has been issued to postpone fuel movements until 1999. Scheduled to complete in 2000.

3.1f Complete inspections to the extent required for transfer of spent fuel to interim dry storage by 9/98.

An additional detailed video inspection of the MTR fuel containers was completed on December 18, 1996. No further inspections will be required to transfer fuel into dry storage.

3.1g Develop a plan to disposition the drums that contain sample residues from the TMI characterization program. Identified during HEU Vulnerability Assessment.

Several drums of TMI-2 core debris (5 to 6 kg. Total uranium, less than 200 g fissle) have been moved to the TRA hot cell. Following characterization, a plan will be developed to determine the disposition of this material. Current date (9/97) is for development of a disposition plan.

8. Vulnerabilities/Corrective Action Plans – ARMF/CFRMF

ID.E 4.1: Corrosion monitoring inadequate at the Advanced Reactivity Measurement Facility /Coupled Fast Reactivity Measurement Facility (ARMF/CFRMF) Canal.

Disposition:

The following items remain open and are tracked on the quarterly report:

4.1d Develop cost, scope and schedule for removal of fuel to dry storage in accordance with the INEEL Integrated SNF Storage Consolidation Plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

4.1e Complete transfer of spent fuel into interim dry storage in accordance with the INEEL Integrated SNF Consolidation Plan by 9/96.

All ARMF/CFRMF fuel elements have been removed and dried in IFSF new canning station with exception of the depleted uranium filter which is scheduled to be moved by 9/30/97.

9. Vulnerabilities/Corrective Action Plans – Idaho Power Burst Facility Canal

ID.E 5.1: Corrosion monitoring inadequate at Power Burst Facility (PBF).

Disposition:

The following action item is still open and being tracked in the quarterly report:

5.1d Develop cost, scope, and schedule for removal of fuel to dry storage in accordance with the INEEL Integrated SNF Storage Consolidation Plan.

Draft INEEL SNF Management Plan issued 12/21/95. Final INEEL SNF Management Plan to be issued following completion of INEEL Task Team Report. Final plan being updated to be consistent with EM 10-year plan and available 9/97.

(3) *

United States Government **Department of Energy**

memorandum

Idaho Operations Office

Date: December 1, 1997

Subject: Emergency Response Action Items as a Result of Secretary Peña's Directives on Chemical Safety, Lessons Learned and Timely Notifications (OPE-OS-97-146)

To: John J. Nettles Jr., Director
Office of Emergency Management
Office of Nonproliferation and National Security

Reference: Secretary Peña memoranda "DOE Response to the May 14, 1997 Explosion at Hanford's Plutonium Reclamation Facility," "Lessons Learned From the Emergency Response to the May 14, 1997 Explosion at Hanford's Plutonium Reclamation Facility," and "Timely Notifications of Emergencies and Significant Events."

Consistent with the subject Secretarial memoranda, Idaho Operations Office has reviewed the status of existing memoranda of understanding (MOUs) with three regional medical centers located in Eastern Idaho. Each of the three MOUs were negotiated and signed in 1991 and remain in force at this time. Efforts are proceeding to renew these MOUs in coordination with local medical facilities. No additional requirements are anticipated for the renewed MOUs. We anticipate completion of the new MOUs by the end of this calendar year.

The existing MOUs provide for timely medical attention to injured or potentially exposed or chemically or radiologically contaminated personnel, communication of all relevant information, and post-event medical monitoring and care of personnel. Exercises are conducted routinely each year with each regional medical center as well as appropriate training for the medical staff at those regional hospitals. In addition, each regional medical center has a copy of the complete hazard assessments for the INEEL which identifies information relative to chemical and radiological hazards.

If you have any questions regarding the attached response, please contact W.D. Jensen at 208-526-7500 or B.G. Edgerton at 208-526-1081.

J.M. Wilcynski
Manager

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Department of Energy
Idaho Operations Office
850 Energy Drive
Idaho Falls, Idaho 83401-1563

December 5, 1997

W. John Denson, President
Lockheed Martin Idaho Technologies Company
P. O. Box 1625, MS-3898
Idaho Falls, Idaho 83415

SUBJECT: Chemical Safety and Emergency Preparedness Initiatives (AM-OPE-97-044)

REFERENCES:

1. Letter, J. M. Wilcynski to W. John Denson, Subject: Request for Specific Action, Assessment, and Reporting Based on Vulnerabilities Identified in the May 1997 Hanford Tank Explosion (OPE-SP-97-093), dated August 14, 1997
2. Letter, J. M. Wilcynski to W. John Denson, Subject: Request for Specific Action, Assessment, and Reporting on Emergency Response Based on Vulnerabilities Identified in the May 1997 Hanford Tank Explosion (OPE-SP-97-100), dated September 12, 1997
3. Letter, W. J. Denson to J. M. Wilcynski, Subject: STATUS REPORT ON THE IDAHO NATIONAL ENGINEERING AND ENVIRONMENTAL LABORATORY RESPONSE TO THE HANFORD TANK ACCIDENT - WJD-150-97, dated November 14, 1997

Dear Mr. Denson:

Chemical Safety and Emergency Preparedness assessments within Lockheed were initiated by DOE-ID in two separate letters. In reference 1, I requested that you take action, assess and report on certain chemical safety issues subsequent to an event at Hanford. Reference 2 added emergency response to the scope of the earlier request. These requests were made in support of concerns expressed by Secretary Peña.

You responded on November 14, 1997 as requested with progress to date, and noted that the assessment activities were not yet complete, and would extend well in to 1998.

I am concerned with the lack of progress to date. I encourage you and the Lockheed team to complete all assessments as soon as possible and as a parallel effort, identify and commence with the changes needed to produce lasting improvements in accordance with Secretary Peña's initiatives. The identification and implementation of needed changes must proceed in a more timely manner.

I expect this effort to have a high priority within Lockheed and be fully integrated with other ongoing initiatives such as Integrated Safety Management, the Voluntary Protection Program, Enhanced Work Planning, the tank inventory initiative, the legacy sample initiative and facility environmental walkthroughs. If you have any questions regarding my expectations, please call.

Sincerely,

J. M. Wilcynski
Manager

cc:
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